

Michael Bolotski
Application No.: 09/480,986
Page 2

PATENT

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method for operating a display having a plurality of pixel elements, comprises:
- a) applying a single transition voltage to the plurality of pixel elements on the display during a first period of time, each pixel element including a liquid crystal material having at least a first state and a second state, wherein a transition of the liquid crystal material from the first state to the second state has an associated first transition time, wherein a transition of the liquid crystal material from the second state to the first state has an associated second transition time, wherein the first transition time is longer than the second transition time, and wherein the single transition voltage induces liquid crystal material in each pixel element to begin transitioning to the second state; thereafter
- b) while each pixel element is transitioning to the second state, applying a first paint voltage to one pixel element of the plurality of pixel elements during a second period of time, wherein the first paint voltage induces liquid crystal material in the one pixel element to a third state; thereafter
- c) waiting a predetermined time period; thereafter
- d) illuminating the one pixel element; thereafter
- e) applying the single transition voltage to the plurality of pixel elements on the display during a third period of time; thereafter
- f) applying a second paint voltage to the one pixel element elements during a ~~fourth~~ fourth period of time, wherein the second paint voltage induces the liquid crystal material in the one pixel element to a fourth state; thereafter
- g) waiting the predetermined time period; and thereafter
- h) illuminating the one pixel element;

Michael Bolotski
Application No.: 09/480,986
Page 3

PATENT

wherein the single transition voltage is between the first paint voltage and the second paint voltage.

2. (Original) The method of claim 1 wherein d) comprises illuminating the one pixel element with an illumination source of a first color, and h) comprises illuminating the one pixel element with an illumination source of a second color.

3. (Previously Amended) The method of claim 1 further comprising after h):

C/cont.
i) applying the single transition voltage to the plurality of pixel elements on the display during a fifth period of time, wherein the transition voltage induces liquid crystal material in each pixel element to begin transitioning to the second state; thereafter

j) applying a third paint voltage to the one pixel element elements during a sixth period of time, wherein the third paint voltage induces the liquid crystal material in the one pixel element to a fifth state; thereafter

k) waiting the predetermined time period; and thereafter

l) illuminating the one pixel element,

wherein d) comprises illuminating the one pixel element with an illumination source of a first color, h) comprises illuminating the one pixel element with an illumination source of a second color, and l) comprises illuminating the one pixel element with an illumination source of a third color.

4. (Original) The method of claim 3 wherein the first color, the second color, and the third color are selected, without replacement, from the group: red color, green color, blue color.

5. (Currently Amended) The method of claim 1 wherein d) and h) both comprise illuminating the one pixel element with the an illumination source.

Michael Bolotski
Application No.: 09/480,986
Page 4

PATENT

6. (Previously Amended) The method of claim 1 wherein applying the single transition voltage to the plurality of pixel elements comprises applying the single transition voltage to all of the plurality of pixel elements at one time while holding a common electrode at a constant value.

7. (Previously Amended) The method of claim 1 wherein applying the single transition voltage to the plurality of pixel elements during the first period of time comprises:

applying the single transition voltage to a first row of pixel elements from the plurality of pixel elements while holding a common electrode at a constant value; and thereafter

applying the single transition voltage to a second row of pixel elements from the plurality of pixel elements while holding the common electrode at a constant value.

8. (Previously Amended) The method of claim 1 wherein applying the single transition voltage to the plurality of pixel elements during the first period of time comprises:

applying the single transition voltage to a first column of pixel elements from the plurality of pixel elements while holding a common electrode at a constant value; and thereafter

applying the single transition voltage to a second column of pixel elements from the plurality of pixel elements while holding the common electrode at a constant value.

9. (Currently Amended) A display having a plurality of pixel elements comprises:

a transaction circuit coupled to each pixel element in the plurality of pixel elements, the transaction circuit configured to apply a single transition voltage to the plurality of pixel elements during a first time period and during a second time period,

Michael Bolotski
Application No.: 09/480,986
Page 5

PATENT

each pixel element including a liquid crystal material having at least a first state and a second state, wherein a transition of the liquid crystal material from the first state to the second state has an associated first transition time, wherein a transition of the liquid crystal material from the second state to the first state has an associated second transition time, wherein the first transition time is longer than the second transition time, and wherein the single transition voltage induces liquid crystal material in each pixel element to begin transitioning to the second state;

C 60x
a paint circuit coupled to the transaction circuit, the paint circuit configured to apply, while each pixel element is transitioning to the second state, a first paint voltage during a third time period and a second paint voltage during a fourth time period to one pixel element from the plurality of pixel elements after the single transition voltage is applied to the plurality of pixel elements, wherein the first paint voltage induces liquid crystal material in the one pixel element to a third state, and wherein the second paint voltage induces the liquid crystal material in the one pixel element to a fourth state;

a timer circuit coupled to the paint circuit, the timer circuit configured to determine when a predetermined time period has elapsed;

an illumination circuit coupled to the timer circuit, the illumination circuit configured to illuminate the one pixel element after the predetermined time period has elapsed;

wherein the single transition voltage is applied to the plurality of pixel elements during the first time period before the first paint voltage is applied to the plurality of pixel elements during the third time period, and wherein the single transition voltage is applied to the plurality of pixel elements during the second time period after the one pixel element is illuminated and before the second paint voltage is applied to the plurality of pixel elements during the fourth time period.

Michael Bolotski
Application No.: 09/480,986
Page 6

PATENT

10. (Original) The display of claim 9

wherein the illumination circuit is configured to illuminate the one pixel element with a first color after the first paint voltage is applied to the one pixel element, and

wherein the illumination circuit is configured to illuminate the one pixel element with a second color after the second paint voltage is applied to the pixel element.

11. (Currently Amended) The display of claim 9

wherein the paint circuit is also configured to apply a third paint voltage to one pixel element from the plurality of pixel elements during a ~~fourth~~ fifth time period after the single transition voltage is applied to the plurality of pixel elements, wherein the ~~second~~ third paint voltage induces the liquid crystal material in the one pixel element to a fifth state;

wherein the single transition voltage is applied to the plurality of pixel elements after the one pixel element is illuminated and before the third paint voltage is applied to the plurality of pixel elements;

wherein the illumination circuit is configured to illuminate the one pixel element with a first color after the first paint voltage is applied to the plurality of pixel elements;

wherein the illumination circuit is configured to illuminate the one pixel element with a second color after the second paint voltage is applied to the plurality of pixel elements; and

wherein the illumination circuit is configured to illuminate the one pixel element with a third color after the third paint voltage is applied to the plurality of pixel elements.

12. (Original) The display of claim 11 wherein the first color, the second color, and the third color are selected, without replacement, from the group: red color, green color, blue color.

Michael Bolotski
Application No.: 09/480,986
Page 7

PATENT

13. (Original) The display of claim 9 wherein the illumination circuit comprises a monochromatic illumination source.

14. (Previously Amended) The display of claim 9 wherein applying the single transition voltage to the plurality of pixel elements comprises applying the single transition voltage to all of the plurality of pixel elements at one time while holding a common electrode at a constant value.

15. (Previously Amended) The display of claim 9 wherein the transaction circuit is configured to apply the single transition voltage to a first row of pixel elements from the plurality of pixel elements while holding a common electrode at a constant value before a second row of pixel elements from the plurality of pixel elements during the first time period.

16. (Previously Amended) The display of claim 9 wherein the transaction circuit is configured to apply the single transition voltage to a first column of pixel elements from the plurality of pixel elements while holding a common electrode at a constant value before a second column of pixel elements from the plurality of pixel elements during the first time period.

17. (Currently Amended) A circuit for driving a liquid crystal display having a plurality of pixels comprises:

an initializing circuit coupled to the plurality of pixels configured to apply a single initial voltage to the plurality of pixels during a first time period and during a second time period, each pixel including a liquid crystal material having at least a first state and a second state, wherein a transition of the liquid crystal material from the first state to the second state has an associated first transition time, wherein a transition of the liquid crystal material from the second state to the first state has an associated second transition time, wherein the first transition time is longer than the second transition time,

Michael Bolotski
Application No.: 09/480,986
Page 8

PATENT

and wherein the single transition voltage induces liquid crystal material in each pixel to begin transitioning to the second state;

a driving circuit coupled to the initializing circuit configured to apply a first drive voltage during a third time period, in which each pixel element is transitioning to the second state, and a second drive voltage during a fourth time period to a pixel from the plurality of pixels after the initial voltage has been applied to the plurality of pixels, wherein the first drive voltage induces the liquid crystal material in the one pixel to a second state, and wherein the second ~~paint~~ drive voltage induces the liquid crystal material in the one pixel to a third state; and

an illumination circuit coupled to the driving circuit configured to illuminate the pixel a predetermined time period after the pixel has been driven with the first drive voltage and after the pixel has been driven with the second drive voltage;

wherein the single initial voltage is applied to the plurality of pixels during the first time period before the pixel is driven with the first drive voltage during the third time period, and

wherein the single initial voltage is applied to the plurality of pixels during the second time period before the second drive voltage is applied to the plurality of pixels during the fourth time period.

18. (Original) The circuit of claim 17

wherein the illumination circuit is configured to illuminate the pixel with a first color after the first drive voltage has been applied to the pixel, and

wherein the illumination circuit is configured to illuminate the pixel with a second color after the second drive voltage has been applied to the pixel.

19. (Original) The circuit of claim 17 wherein the first color and

the second color are selected, without replacement, from the group: red color, green color, blue color.

Michael Bolotski
Application No.: 09/480,986
Page 9

PATENT

20. (Previously Amended) The circuit of claim 17 wherein the initializing circuit is configured to apply an initial voltage to all of the pixels in the plurality of pixels at one time while holding a common electrode at a constant value.

21. (Original) The circuit of claim 17 wherein the initial voltage is between the first drive voltage and the second drive voltage.

22. (New) A method for operating a display having a plurality of pixel elements, the method comprising:

applying a single transition voltage to the plurality of pixel elements to transition the pixel elements to a bright state;

while the plurality of pixel elements are transitioning to the bright state, applying a drive voltage to one pixel element of the plurality of pixel elements; thereafter waiting a predetermined time period; and thereafter illuminating the one pixel element.

23. (New) The method of claim 22 wherein applying the single transition voltage to the plurality of pixel elements comprises applying the single transition voltage to all of the plurality of pixel elements at one time.

24. (New) The method of claim 22 wherein applying the single transition voltage to the plurality of pixel elements comprises:

applying the single transition voltage to a first row of pixel elements from the plurality of pixel elements while holding a common electrode at a constant value; and thereafter

applying the single transition voltage to a second row of pixel elements from the plurality of pixel elements while holding the common electrode at a constant value.

25. (New) The method of claim 22 wherein applying the single transition voltage to the plurality of pixel elements comprises:

Michael Bolotski
Application No.: 09/480,986
Page 10

PATENT

could,

applying the single transition voltage to a first column of pixel elements from the plurality of pixel elements while holding a common electrode at a constant value; and thereafter

applying the single transition voltage to a second column of pixel elements from the plurality of pixel elements while holding the common electrode at a constant value.